

18/06

with the author's Compliments

79

21

# Effects of Alcohol on The Human System.

---

---

BY  
REVD. N. H. LOUWYCK.

---

---

MISS A. DOYLE,  
GAWLER PLACE, ADELAIDE.

---

1906.

---

---

PRICE - - - TWOPENCE.

---

---

# PREFACE.

---

The following resolutions were adopted at the Catholic Congress held in Melbourne, 1904 :—

“ That inasmuch as God works by human instruments in building up His Kingdom of Righteousness, this Congress urges Catholics to aid in the reclamation of the victims of intemperance, and in the protection of the young from the perils arising from the mischievous and indiscriminate use of strong drink. To gain these ends the Congress advises :—

(a) The systematic instruction of the young in the truths which science reveals as to the deleterious effects of alcohol on the human body.

(b) The hearty moral support of all men of good-will to the temperance cause, with the object of creating a healthy and intelligent public opinion on the evils which follow the abuse of intoxicants, and on the grave necessity which exists for lessening the many temptations to drink that abound on every side, and bring about a reformation of the foolish drinking customs of the day.”

The American Medical Society for the study of alcohol and other narcotics, the members of which recently met at Portland, Oregon, in convention, adopted the following commendable resolutions :—

“ Whereas, we believe that prevention through education is one of the great remedies for the evils of intemperance and other unhygienic habits, therefore, resolved—That we congratulate the people of this Country on having made the study of Physiology and Hygiene, including the nature and effects of alcoholic drinks and other narcotics compulsive for her 22,000,000 children of school age, and also of Great Britain on the fact that

more than 15,000 physicians, practically the entire registered medical profession of the United Kingdom, have petitioned for compulsory public study of the same subject. Whereas, a Committee of distinguished British physicians of the United Kingdom, with Sir William Broadbent, M.D., as Chairman, composed of professors in the Universities and Medical Colleges representing the 15,000 physicians, have adopted and sent out to all the School Boards of Great Britain, a course of study in hygiene and temperance, which is based, they courteously state on the title page, upon the scheme prepared for use in the schools of the United States of America, by Mrs. Mary H. Hunt ; and, whereas, when subsequent unjust criticism against teaching the children and youth that alcohol is a poison was made, they, in a masterly way, answered this criticism, point by point, exposing its fallacies ; therefore, resolved—That we recognise and heartily welcome the valuable assistance thereby rendered the cause of science in its battle against alcoholism by these distinguished physicians ; and, whereas, we rejoice in the evidence that the public school teachings in America of Physiology and Hygiene, including the nature and effects of alcoholic drinks and other narcotics is resulting in better obedience to the laws of health, in a growing sentiment in favor of public sanitation and total abstinence, despite our enormous foreign immigration, and in the rapidly increasing prohibition of alcohol in industrial employments ; therefore, resolved—That we urge upon the Boards of Education, teachers, and all interested in the instruction of the children and youth of our land the importance of the most faithful enforcement of our temperance education laws by providing ample courses of study like that which has now become International by being recommended by Great Britain by the above-named Committee, showing in detail the topics to be taught in each grade, and also by the selection of school literature containing the latest truths of science on these topics.” (Extracted from “Physical Developement.”)

The following placard was issued by the Southwark Borough Council (London). Many similar placards are distributed all over Belgium :—

“Metropolitan Borough of Southwark. Physical Deterioration and Alcoholism.”



The report of the Committee, presented to Parliament, by command of His Majesty, states that :—The abuse of alcoholic stimulants is a most potent and deadly agent of physical deterioration. Alcoholic persons are specially liable to tuberculosis and all inflammatory disorders. Evidence was placed before the Committee that in abstinence is to be sought the source of muscular vigour and activity. Certain Insurance Tables show that of 61,215 men, between the ages of 25 and 65, 1,000 die in one year, but in abstainers only 500 die in the same period. The lunacy figures show a large and increasing number of admissions of both sexes, which are due to drink. The following facts recognised by the medical profession are published in order to carry out the recommendation of the Committee, and to bring home to men and women the fatal effects of alcohol on physical efficiency :—

1. Alcoholism is a chronic poisoning resulting from the habitual use of alcohol (whether as spirits, wine, or beer), which may never go as far as drunkenness.
2. It is a mistake to say that those doing hard work require stimulants. As in fact, no one requires alcohol as either food or tonic.
3. Alcohol is in no sense a food, and cannot repair the tissues. It is really a narcotic, dulling the nerves like laudanum or opium, but is more dangerous than either in that often its first effect is to weaken a man's self control, whilst his passions are excited, hence the number of crimes which occur under its influence.
4. Spirits as usually taken rapidly produce alcoholism, but milder alcoholic drinks, as beer, or even cider, drunk repeatedly every day, produce after a time alcoholic poisoning with equal certainty.
5. The habit of drinking leads to disgust for work, the ruin of families, the neglect of social duties, misery, theft, and crime.

It leads also to the hospital, for alcohol produces the most varied and the most fatal diseases, including paralysis, insanity, diseases of the stomach and liver,

and dropsy. It also paves the way to consumption, and frequenters of public houses furnish a large proportion of the victims of this disease. It complicates and aggravates all acute diseases. Typhoid fever, pneumonia, and erysipelas are rapidly fatal in the subject of alcoholism.

6. The sins of alcoholic parents are visited on the children. If these survive infancy they are threatened with idiocy or epilepsy, and many are carried away by tuberculosis, meningitis, or phthisis (consumption).

7. In short, alcoholism is the most terrible enemy to personal health, to family, to happiness, and to national prosperity. Remedy for alcoholism — Total abstinence from all alcohol, the teaching of temperance in elementary schools, the improvement of the home and its surroundings, the provision of plenty of good and properly cooked food, house and personal cleanliness, education of girls and young women in home management, physical training of young men.

Arthur W. Jephson, M.D., J.P., Mayor.

G. B. Millson, Medical Officer of Health.

Town Hall, Walwork Road, October, 1905.

Similar resolutions were passed on the reports of Doctors Van Coillie, Nugens, and Luc Severin, at the International Anti-Alcoholic Congress of Liege, held under the patronage of the Belgian Bishops. The Right Reverend Dr. Turinaz, the learned Bishop of Nancy (France), said at that Congress that the clergy must use all their energy to combat intemperance. Their work, he said, against alcoholism must be constant, powerful, persevering, universal.

My aim in presenting this small pamphlet to the public is, not to discuss the moral or social questions relating to the effects of alcohol as a beverage, but to consider its action on the human system.



## Chapter I. ALCOHOL.

Alcohol is a colorless, neutral, and volatile liquid, having a burning taste, and a pleasant, spirituous odor. Alcohol by weight is :—carbon, 52.2 parts ; hydrogen, 13 parts ; and oxygen, 34.8 parts. Thus alcohol may be classed as hydro-carbon, like fats and oils. Alcohol is made from oil of Rue, whale oil, Spermaceti, stearic acid, Chinese wax, beeswax, parsnip oil, castor oil, by distillation from wood, and by fermentation.

Methyl alcohol (wood spirit) is colorless, and is used as an adulterant and substitute for ethyl alcohol. The crude material contains tar and much acetone. Taken internally, even in small doses, for some time, it produces blindness.

Ethyl alcohol (common alcohol) or spirit of wine is produced in the vinous fermentation of sugar.

Pentyl alcohol (amyl alcohol) is a by-product in fermentation, and is found in raw spirits and new liquors. When pure it is a colorless, oily liquid, with a peculiar odor, and decidedly poisonous.

Fusel oil is a mixture of alcohols, largely amyl alcohol.

Alcohol as a beverage is a liquid obtained by the distillation of fermented grain or starchy substances.

Fermentation is a peculiar chemical action due always to the presence of minute living beings, belonging generally to the vegetable kingdom. There are different kinds of fermentation, but one of the most common is that in which alcohol and carbonic acid are formed. Acetic and other acids are also produced by the action of certain ferments. Sometimes, as in the case of beer and wine, the fermentation sets in without the addition of a ferment. During the fermentation of a liquid, the rapid multiplication of the organisms may be watched under the microscope. The yeast plant is the ferment used in the brewing of beer. The juice of the grape already contains a ferment, so that no such addition is necessary in the making of wines. The effervescence of fermented liquids is due to the carbon dioxide which is produced with alcohol. The carbon dioxide is retained by bottling the liquid before the fermentation is over. When the sugary juice of a fruit, such as the grape, is left to itself at a moderate temperature, fermentation takes



place from the influence and action of germs, which adhere to the skin of the grapes and are introduced in the "must" on pressing; this process differing very much from that in making beer, when the starchy or sugary infusion is boiled and the yeast added to make it ferment. During the fermentation of the fruit juice, a part or whole of the sugar is converted into alcohol. When quite pure and free from water, alcohol is termed absolute; when mixed with 16 per cent. of water it is called rectified spirits; and when mixed with 42.95 per cent., volume in volume of water, it constitutes proof spirit.

Wine is fermented juice of various species of grapes, with such additions as are essential to the stability or keeping of the liquid.

All wines can be divided according to their alcoholic strength into two classes:—The natural wines, containing from 6 to 13 per cent. by weight of alcohol, and the fortified wines, containing from 13 to 22 per cent. by weight of alcohol. All wines contain free acids and a small percentage of mineral salts, and about 0.020 per cent. nitrogen.

There are several processes which are frequently employed for either artificially improving wine, or increasing its volume. Thus, the addition of alcohol to the wine renders it stronger and more permanent; so, too, the addition of glycerine makes it sweeter; and various essences render it more fragrant. A manufacture of artificial wine from water, sugar, tartaric acid, and alcohol is by no means unknown. Mineral acids, and mineral salts, plaster Paris, are added to increase the dryness of wine. Wine is sometimes adulterated with fusel oil (a very poisonous alcohol), artificial coloring, charcoal, potassium permanganate, crude and purified bone-black and lamp-black, lime salts, tannin, alum, copper, lead, and zinc, arsenic, crude glucose, and anilin colors.

Of all alcoholic beverages spirits contain the largest amount of alcohol. The basis of them all is ethylic alcohol mixed with water. They all contain various ethers and fragrant bodies produced during distillation.

Brandy is made by distillation of fermented grape juice. An inferior quality is manufactured from skins and stalks ("Marc") of the grapes. Freshly distilled

brandy is colorless, but on staining in casks, it dissolves a minute quantity of tannin and other bodies, and acquires an amber tint. It is also frequently colored with caramel. So-called British brandy is made from grain spirit, to which is added flavoring esters, such as ethyl acetate, perlargonate and nitrate, bitter almonds, spices and caramel.

Whisky is the spirit distilled from fermented grain, or corn grain, sometimes from barley, rye, or potatoes, with the addition of glucose. The spirit from raw grain contains usually more fusel oil. Creasote is sometimes added to give it a smoky flavor. A variety of whisky is made by distilling cider. English whiskies are occasionally adulterated with methyl alcohol; cayenne pepper is also added to give a warm taste. Lead, copper, and zinc have been found in whisky.

Gin is usually prepared by distilling grain spirit which has been flavored with various bodies, viz.:—Juniper berries or oil of juniper, turpentine, coriander and cardamon seeds, capsicum and calamus roots.

Rum is the spirit obtained by distilling fermented juice of the sugar-cane, or more commonly by distilling fermented molasses, the skimmings of sugar boilers. Much of the commercial article is made from grain spirit, to which has been added butter distilled with sulphuric acid.

Malt liquors are, strictly speaking, infusions of malt fermented by yeast and rendered bitter by the addition of hops. Substitutes for hops are quassia, chiretta, and aloes. The substitutes for malt are unmalted cereals, glucose, and starch. The addition of salicylic acid, sodium fluorid, sodium-silico fluorid, sulfites, and sodium bicarbonate is very common.

## Chapter II.

### CHEMICAL CONSTITUENTS OF THE HUMAN BODY.

The chief elements found in the human body are:—Oxygen, forming about 72 per cent. of the weight; carbon, 13.5 per cent.; hydrogen, 9 per cent.; nitrogen, 2.5 per cent.; calcium, 1.3 per cent.; phosphorus, 1.2 per cent.; sulphur, 0.15 per cent.; sodium, chlorine, fluorine, potassium, iron, magnesium, and silicon are also pre-



sent in small quantities. Water constitutes 58.5 of the entire body, and is present in different tissues in widely varying amounts. The four principal elements of the human body are oxygen, hydrogen, carbon, and nitrogen. Oxygen is an invisible gas, which powerfully supports combustion, but it is not itself combustible. Carbon is a solid element. When carbon burns it combines with the oxygen of the air, forming an invisible compound gas, called carbonic acid gas. This gas is also produced by the combustion of any compound substance which contains the element carbon, such as coal, coal gas, wood, oils, spirits. Hydrogen is the lightest gas known (about  $14\frac{1}{2}$  times lighter than air). When hydrogen burns it combines with oxygen of the air and forms water. It does not support combustion. Nitrogen is a very inactive gas. Its use is to modify the action of the oxygen, which, if present alone, would be too powerful for the support of animal life.

### Chapter III.

#### METABOLIC EQUILIBRIUM.

By Metabolic Equilibrium is understood that normal condition in which precisely the same amount of material for the maintenance and growth of the organism is taken up and assimilated from the digested nourishment as is removed from the body through the excretory organs in the form of waste materials, or end products of retrogressive tissue—metamorphosis. The income must always balance the expenditure. During the period of growth of the body, a certain excess of formative activity corresponding to the increase in size of the body must predominate.

Every tissue and fluid of the body is composed of a number of organic and inorganic compounds.

The organic compounds may be classified into :—

(a) Non-nitrogenous, containing carbon, hydrogen, and oxygen, but no nitrogen.

(b) Nitrogenous, containing carbon, hydrogen, oxygen, and nitrogen.

The inorganic or mineral compounds found in the body are derived from our food and drink. Many of these pass

through the body without undergoing any change; others form a necessary part of the structure of certain tissues. The principal inorganic compounds are water, calcium, carbonate, calcium phosphate, and common salt.

The principal sources of loss to the body are :—

(a) The lungs. By means of the lungs we lose both water and carbonic acid gas.

(b) The skin. By means of the skin we lose water, a small quantity of mineral salts, and a little carbonic acid gas.

(c) The kidneys. The kidneys are the source of a considerable loss of water, and a very large quantity of urea.

An adult with moderate activity loses daily through the above-named sources :—Water, 2,690 grams ; carbon, 2,612 grams ; hydrogen, 3.3 grams ; nitrogen, 15.8 grams ; and oxygen, 669.45 grams.

The high temperature of the body is produced and maintained by chemical action. This action is chiefly oxidation, very closely resembling that which takes place when a candle burns. A constant supply of oxygen is also obtained by the blood as it circulates through the lungs, and we may regard the carbonic acid gas given off as the product of the continuous oxidation of carbon in the body.

Nitrogenous foods are tissue forming foods ; non-nitrogenous, heat producers. Both nitrogenous and non-nitrogenous foods are oxidised in the body, and therefore help to maintain the high temperature. It is known, however, that none but nitrogenous food substances are capable of forming tissues.

The human blood is composed of :—Carbon, 58.0 ; oxygen, 19.0 ; nitrogen, 17.5 ; hydrogen, 7 ; and mineral matter, 4.5 per cent. The nitrogenous substance called haemoglobin gives the red corpuscles to the blood. This substance contains a considerable proportion of iron oxide, and has the power of combining with oxygen gas. As the blood courses through the capillaries surrounding the air-cells of the lungs, the haemoglobin combines with oxygen of the air, becoming a bright scarlet color. The blood thus changed in color returns to the heart, by

which it is forced through the body. Then, in passing through the tissues of various organs, and especially the muscles, the haemoglobin gives up some of its oxygen, which seems to be held by only a feeble chemical affinity to the carbon and hydrogen of these tissues, forming a dark purple, and the blood again returns to the lungs with the carbonic acid gas in solution. From the above it will be readily understood why the haemoglobin has been termed the oxygen carrier of the blood.

To repair all this loss to the body an adult with moderate activity requires daily :—Carbon, 281.20 grams ; hydrogen, 39.19 grams ; nitrogen, 18.88 grams ; and oxygen, 200.73 grams. In addition :—744.11 grams of oxygen from the air by respiration ; 2818 grams of water ; and 32 grams of inorganic compounds (salts).

#### Chapter IV.

### GENERAL EFFECTS OF ALCOHOL ON THE HUMAN BODY.

We have seen in the first chapter that alcohol contains :—Carbon, 52.2 parts ; hydrogen, 13 parts ; and oxygen, 34.8 parts ; but no nitrogen. In the third chapter we have seen that an adult loses daily 15.8 grams of nitrogen, and in the second chapter that nitrogen is one of the principal constituents of the body. It is evident, therefore, that alcohol is not a waste repairer, and is not a food for the human system.

Alcohol contains too much oxygen, and no nitrogen to counterbalance this too violent element. Alcohol by its rapid combustion increases the force and quickness of the heart's action. It tends to increase the blood pressure, and to increase the flow of blood from the arteries into the veins. But it is not a blood-forming substance, as it contains no nitrogen, and the blood contains 17.5 per cent. of nitrogen. The effect, however, is not lasting, and is largely counter-balanced by a coincident dilatation of the cutaneous blood vessels, which thus become flushed and tend to produce more or less sensible perspiration. Alcohol has been noticed to produce the extrusion of filaments of the blood, to coagulate it, and render it white and opaque. It has been proved to lower the temperature from 96 to 90 degrees, F. In



not only necessary that there should be an abundant exhaustion following great fatigue alcohol may be useful or harmful according to circumstances. If exertion must be resumed, then the action of the heart can be increased by alcohol, and more blood sent to the muscles. But this is always done at the expense of the heart's nutrition, and is only very temporary; then, also, the amount taken must be very small. But, when renewed exertion is not necessary, it would appear most proper after great fatigue to let the heart and muscles recruit themselves by rest, to give digestive food, and to avoid unnecessary and probably hurtful quickening of the heart by alcohol. Thus it has been proved by many experiments that men engaged in hard work are much better without any alcoholic beverage. Alcohol also lowers the natural resistance of the body against cold. When a man is exposed to cold, he may feel some very temporary sensation of warmth from taking alcohol, but his power of resistance to the cold is lessened, and, instances have been recorded where death has occurred under such circumstances.

All alcoholic beverages taken in small quantities appear to aid digestion; when taken habitually, or in large amounts, they cause derangement of the nervous system by over-stimulation, and undermine the forces of mind and body, partly in consequence of their poisonous properties, chiefly due to their volatile constituents (fusel oil) affecting the nervous system permanently, partly through their direct action in causing injurious catarrhal and inflammatory conditions in the digestive organs, and partly, finally through interference with and impairment of the normal metabolism. They produce an increase of the connective tissue between the glands, cause fatty and cystic degeneration of the contents of the glands, and, finally, cause atrophy and total disappearance of these parts.

Dr. Erichsen, in his "Science and Art of Surgery," speaking of the causes of inflammation says:—"Anything that enfeebles the heart's action to such a degree as to interfere with the supply of blood to the tissues, acts as a predisposing cause of inflammation. Thus operation wounds are more prone to become inflamed after great loss of blood, and in patients weakened by long fever or want of food. For healthy nutrition it is

supply of blood, but the blood that is supplied must be in a healthy condition. The blood may be rendered impure by the addition to it of some substance not normally present, or by the imperfect elimination of the products of normal tissue change, or by the deficiency of some of its normal constituents. The most common and most important of the first class of conditions is the habitual presence in the blood of an amount of alcohol in excess of that which can be easily eliminated or consumed. There can be no doubt that this condition of chronic alcoholism exerts a most prejudicial influence on all operations and diseases." Speaking of the causes of aneurism, he says:—"A forcible and occasionally greatly increased action of the heart is often the immediate cause of the dilatation of the vessels and the production of aneurism."

Dr. Jacquet and Dr. Renault forwarded to the Medical Society of Hospitals in France a communication on the strength-giving qualities of alcohol. They say that alcohol never gives strength. They interviewed the principal champions of bicycle races. They one and all admitted that alcohol, to use their own expression, "cut their legs."

Recent observations at the Laboratory of Gaule, in Zurich, demonstrate not only that alcohol, ether, and chloroform, destroy cellular protoplasm, but also that the cells which are the most complicated, so far as function is concerned, such as nerve cells, are the most vulnerable. These conclusions were confirmed by other experiments, and the whole tendency of experiments and observations at the present day is to show the degenerative effect of alcohol on elementary histological units.

The action of beer upon tissue change, as far as is known, is one of lessened excretion. The urea and pulmonary carbon dioxide being both decreased. On the nervous system the action is probably the same as that of alcohol. When beer is taken in large quantities it produces gradually a state of fulness of the system, which probably arises from the continual, though slight, interference with elimination both of fat and nitrogenous tissues. The imperfect oxidation leads to excess of partially oxidised products, such as oxalic and uric acids. This is the reason why the habitual beer drinker appears fat or "blown-up."

## Chapter V.

## ALCOHOLISM.

Alcoholism is the effect on the human economy through the intemperate use of alcohol in some one of the forms in which it is used as a beverage. Such effect is either acute or chronic.

Acute alcoholism is drunkenness or inebriety. Varying amounts of alcohol are required to produce it. Very small quantities sufficing to intoxicate those unaccustomed to its use, while the habitual drinker can consume large quantities without being intoxicated. In drunkenness the brain is the seat of an active abnormal accumulation of blood; the mucous membrane of the stomach and duodenum is markedly injected and covered with a ropy mucus slightly tinged with blood; the gastric juice is altered in quality and quantity. The kidneys are also the seat of an active accumulation of blood.

The order of symptoms is not always the same. More frequently the primary effect is one of excitement, associated with flushed face, bright eye, and loose tongue. To this succeeds the well-known staggering gait of drunkenness, which increases until the subject is unable to walk, and, finally, falls to the ground. The ready speech, at first coherent, now wanders at random, and, finally, ceases altogether. The stage of narcosis is reached, and the drunken man breathes stentorously in his sleep, his face being congested, and his breath alcoholic. He may perhaps be aroused and respond vaguely and incoherently to a question, but soon drops off to sleep again. In another subject the first stage is much more violent, and he may cry out boisterously, and either spontaneously, or upon the slightest provocation, inflict injury, or even commit murder. In other subjects, again, there is no stage of excitement, and they are morose, or pass gradually and directly into stupor. The stage of incoordination and ultimate stupor is, however, invariable if the quantity of alcohol taken is enough to bring it about. The effect is upon the cortical nerve cells of the brain. Other less conspicuous features are a lowered temperature (96 to 90 degrees, F., or even lower), involuntary evacuation of the bowels and bladder, dilated pupils, and muscular twitchings.



The diagnosis of drunkenness is usually easy, yet mistakes are not infrequent. It has been taken for apoplexy, or apoplexy with fracture of the skull. Some cases of ordinary drunkenness do not pass beyond the stage of exhilaration, ending in a mild coma, or sleep.

Chronic alcoholism is a condition which supervenes sooner or later in individuals who habitually use alcohol intemperately. Dipsomania is a term applied to a condition in which there is an inherited immoderate desire for alcohol at times, followed by periods in which there is no such inclination. Intemperance does not always imply the consumption of large amounts of alcohol; smaller quantities producing harmful effects in some persons, while larger amounts are apparently harmless in others. The predisposition in some persons to be easily affected organically by alcohol is due to some as yet uncomprehended constitutional weakness. There is a good reason to believe that the children of alcoholics are not only more susceptible to the degenerative effects of alcohol, but also to other diseases, such as gout, rheumatism, syphilis, and diseases of the nervous system. Among the latter may be mentioned especially epilepsy, melancholia, dementia, and insanity.

Chronic alcoholism is the direct, or indirect, cause of many other diseases. The direct effect is mainly on the protoplasm of the cells, modifying or impairing their normal metabolism, at times, destroying cells and substituting them by fibroid material; at other times simply delaying oxidation, as in the case of the adipose vesicle, whose fat remains unoxidised because its conveyer, alcohol, is more easily oxidised. Different kinds of alcoholic beverages also seem to act differently, some as gin, producing destruction of liver cells and cirrhosis: while others, as malt liquors, produce fatty livers. It is also true that persons addicted to intermittent debauch are less liable to inflammatory lesions than the constant consumers.

Chronic alcoholism is attended by fatty infiltration of the liver, because more carbo-hydrate is introduced than can be burned up. It is, therefore, stored in the liver cells. Cirrhosis of the liver is a disease characterised by an overgrowth of connective tissue with more or less destruction of the soft cellular substance of the organ.

Death of the cells is primary, and the overgrowth of connective tissue secondary. Acknowledging that the majority of cases which produce the disease operate through the portal circulation, it is only reasonable that the cells whose business it is to eliminate the poison should receive the first sting, and perish in consequence, and that their place should be supplied by a reactive overgrowth of connective tissue as Weigert has shown. We may also admit a reactive contracting effect of the new connective tissue on remaining cells, producing then the death of a greater number. But poisons do not enter by the portal vein alone; irritants may enter by the systematic circulation (the hepatic artery) and passively by the hepatic veins and bile-ducts when obstruction occurs in either of these sets of vessels. Generally the course of cirrhosis is from bad to worse, although it may be a slow course. The effect of alcoholism on the kidneys is two-fold in the direction of contraction and enlargement—the former due to gradual destruction of venal cells and tabules with substitution of interstitial tissue; the latter to fatty infiltration and hypertrophy. The enlarged kidney of alcoholics was studied by the late Dr. Henry F. Formad, who, as coroner's physician for many years, in Philadelphia, made an enormous number of autopsies on drunkards. He called it the "Pig-back" kidney, and found true hypertrophy rather than a degenerative change. Chronic interstitial nephritis, a chronic process resulting ultimately in a shrunken kidney, in which there has been extensive destruction of the tabular substance and overgrowth of interstitial connective tissue is, according to Tyson, caused largely by chronic alcoholism.

The abuse of alcohol often causes chronic valvular disease of the heart; sometimes mitral insufficiency, or leaking of the valves. Hypertrophy of the heart is often the result of excessive drinking, especially of large quantities of beer. Alcohol is the cause also of inflammation of blood vessels.

Chronic gastric catarrh is one of the most frequent consequences of chronic alcoholism, producing loss of appetite, nausea, constipation, coated tongue, and foul breath—symptoms which are always worse in the morning.

The interstitial overgrowth, so characteristic of cirrhosis of the liver, is probably secondary to a primary poisonous and destructive effect of alcohol on the cells, as confirmed by Weigert, and more recently by those of Obersohn and Wilkins. The compression of the cirrhotic liver on the portal vessels produces secondary effects, viz., hyperemia of the stomach, causing gastric catarrh, of the rectum producing hemorrhoids, and of the esophagus, pharynx, and nasal mucous membrane resulting in hemorrhage in any one of the localities; in dilatation of the venae of the face and nose, and eruptions on the latter, constituting the "blossom," by which the "topper" is marked.

Gradual mental deterioration is an inevitable consequence sooner or later of chronic alcoholism. It is manifested in sluggishness of intellect, in weakness of resolutions, a loss of moral character, in irritability, restlessness, and occasional dementia and insanity. When these two last are present, they are probably due to vascular degeneration, and consequent secondary changes in the brain structure. The tendency of such insanity is toward delusions, including suspicion, distrust, fear of impending evil, and more rarely, delusions of grandeur, as in general paralysis of the insane. Dizziness, thrombosis, apoplexy, and softening of the brain are consequent symptoms.

Alcoholics are degenerates of a special class. Their mental faculties vary according to the gravity of the evil. From the habitual drunkard to the demented alcoholic there are many degrees. The ravages on the mind caused by alcohol are as rapid as they are deep, and many lose their mind at the bottom of their glass. The form of degeneration caused by alcohol is characterised by a loss of reason, by brutality, and perversion of morality, and, finally, leads to all kinds of disorders and crimes. Alcoholism is inheritable, and if it does not always lead to idiocy, it gives to the descendants of alcoholic parents the germ of mental diseases, which finally cause the degradation and destruction of that special race. Moret has given reliable statistics which prove that the effects of alcoholism may extend to the fourth generation. In the first generation, immorality, depravation, and moral brutality are developed. In the



second generation we find maniacal attacks, general paralysis. In the third we witness hypocondriac tendencies. In the fourth we find the first signs of lunacy about the age of 16 years, followed by stupidity, a tendency to imbecility, and, finally, lunacy and destruction of that special race.

Alcoholics produce lunatics.

Alcoholic excesses are especially potent causes of general paresis. With the excessive use of alcohol the effect in some cases is direct, and the most conservative of writers say that it is prolific in its tendency when intellectual or emotional strain exists. A mere physiological hyperemia of the brain under the use of alcohol may become pathological, and determine the onset of paresis. General paresis usually arises from a combination of causes, the most common direct cause being excesses of all kinds, whether sexual or alcoholic, which act more powerfully when associated with strain, worry, and anxiety.

Dipsomania or Oinomania is the inherited or acquired mental condition that craves the drinking of intoxicating liquors. It is a true mental disease. It manifests itself in periodic attacks of excessive indulgence of alcoholic drinking, or this symptom of this sad disease may be replaced by other irresistible diseases of an impulsive kind, such as lead to the commission of various crimes; the gratification of depraved appetites, imbecility and dementia, frequently result. The paroxysms at first occur at long intervals, but gradually the intervals become shorter and shorter, until the individual entirely surrenders himself to alcoholic and other excesses. Mania a potu or delirium tremens is a special manifestation of chronic alcoholism, ascribed to the long-continued action of alcohol on the brain, though its occurrence coincides with the sudden withdrawal of the alcohol. On the other hand, a debauch, however prolonged, by a person previously temperate, is seldom followed by mania a potu, so that the relation of the illness to the withdrawal of alcohol may be more apparent than real. The first symptom is usually sleeplessness, associated with intense depression, or there may be intense restlessness during which the patient, unless restrained, will go out of the house on some imaginary business. To this succeed

hallucinations of vision, as the result of which he imagines he is pursued by monsters, snakes, rats, mice, and other vermin. The intense shivering terror of the victim under the circumstances is pitiable, and the "horrors" is but a feeble expression of the terrors of the patient. Frequently, in his attempts to escape these objects, he is unmanageable, and must be confined. Suicide is not infrequent with such patients. At other times the eager though misguided intelligence displayed in watching these imaginary objects is amusing. Auditory hallucinations may be present, and unusual noises complained of. At the same time, even though the patient is violent, the pulse will be found frequent, feeble, and often irregular. There is a great muscular weakness, as evidenced by the tremor which accompanies all muscular acts.

### SUMMARY.

1. Alcohol is composed of carbon, hydrogen, and oxygen, and is classed as carbo-hydrates. It contains no nitrogen.
2. Alcohol is frequently adulterated with very poisonous substances.
3. The principal constituents of the human body are:—carbon, hydrogen, oxygen, and nitrogen.
4. The waste of the body is chiefly in carbon, hydrogen, oxygen, and nitrogen.
5. To repair that loss, carbon, hydrogen, oxygen, and nitrogen are necessary in our daily food.
6. Alcohol not containing nitrogen is no food, and no waste repairer.
7. Alcohol has a deleterious effect on nearly all the organs of the body, chiefly through want of nitrogen, and through excess of oxygen.
8. Alcoholism is the effect on the human economy through the intemperate use of alcohol, and is either acute or chronic.
9. Alcoholism is the cause of many diseases of the liver, kidneys, stomach, heart, nerves, and brain.
10. Alcoholism leads to lunacy.
11. Alcoholics produce lunatics.

## AUTHORS CONSULTED.

- "Medical Chemistry," by H. Leffmann, A.M., M.D.  
 "Food Analysis," by H. Leffmann and Beam, M.D.  
 "Inorganic Chemistry," by W. Jago, F.C.S., F.I.C.  
 "Chemistry," by W. Furneaux, F.R.G.S.  
 "Theory and Practice of Hygiene," by Notter and Firth.  
 "Human Physiology," by W. Furneaux.  
 "Text Book of Physiology," by Dr. L. Landois.  
     "                            "          by A. P. Brubaker, M.D.  
 "Cyclopedia of Medicine and Surgery,"  
   by Gould and Pyle, M. D.  
 "Anatomy and Dict. of Med.," by R. Quain, M.D.  
 "Science and Art of Surgery," by Erichsen, M.D.  
 "Practice of Medicine," by J. Tyson, M.D.  
 "Diagnosis of Mental Diseases," by H. T. Pershing, M.D.  
 "General Paresis," by R. H. Chase, M.D.  
 "La Morale, la Medecine et l'Hygiene,"  
   by Dr. George Surbled.  
 "Pastoral Medicine," by Dr. Carl Capellmann.

